WSP

300 Trade Center
Suite 4690
Woburn, MA 01801
Main: 781 933 7340
www.wspgroup.com/usa

VIA ELECTRONIC MAIL AND FEDERAL EXPRESS

September 24, 2013

Jennifer L. LaPoma
Remedial Project Manager
Western New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866

Re: Comments on the July 2013 Proposed Remedial Action Plan for Operable Unit 1 of the New Cassel/Hicksville Groundwater Contamination Superfund Site, Nassau County, New York

Dear Ms. LaPoma:

On behalf of our client, Vishay GSI, Inc. (VGSI), WSP USA Corp. is submitting this letter to provide comments on the U.S. Environmental Protection Agency's (EPA's) July 2013 Proposed Remedial Action Plan (PRAP) for Operable Unit 1 (OU1) of the New Cassel/Hicksville Groundwater Contamination (NCHGW) Superfund Site (Site) located in Nassau County, New York. OU1 is defined as contaminated groundwater immediately downgradient of the New Cassel Industrial Area (NCIA) and is only one portion of the Site. The PRAP is an interim remedy to be implemented while EPA evaluates additional remedies for additional OUs at the Site.

For many years, VGSI has been conducting environmental investigation and remediation associated with the former General Instrument Corporation (GIC) site located at 600 West John Street in Hicksville, New York. While the proposed OU1 treatment area does not address any contaminants in groundwater associated with the former GIC site, VGSI believes the interim remedy needs further evaluation and reconsideration. In addition, VGSI has considerable familiarity with the various challenges presented by the in-well stripping technology proposed as part of the OU1 remedy, all of which were detailed in technical reports submitted to NYSDEC. It is apparent that the unique operation and maintenance issues associated with implementing in-well stripping in this section of the aquifer were not considered by EPA. As such, VGSI believes that submittal of the comments presented in this letter is both appropriate and necessary.

Background & History

The Site consists of 6.5 square miles of groundwater contamination within the towns of Hempstead, North Hempstead, and Oyster Bay in Nassau County, New York. The NCIA portion of the Site includes approximately 170 acres of land that was developed for industrial use from the 1950s through the 1970s. Onsite leach pools and/or dry wells were generally used for disposal of wastewater until sewers were installed in the 1980s. The area within OU1 encompasses approximately 211 acres and includes residential and commercial/light industrial properties[1].

[1] EPA. Superfund Proposed Plan, New Cassel/Hicksville Groundwater Contamination Superfund Site, Nassau County, New York. July 2013.

The Site is underlain by glacial outwash and morainal deposits known as the Upper Glacial Aquifer (UGA), the underlying Magothy Formation and Matawan Group (Magothy), and the Raritan Formation. The UGA is approximately 40 to 65 feet thick and consists of coarse-grained sands and gravel. The Magothy formation sediments are estimated to be 600 feet thick and are characterized by sand and silty sand with discontinuous clay and silt layers. Unconfined groundwater is generally found at 40 to 65 feet below ground surface (bgs) near the estimated boundary between the UGA and Magothy formations. Groundwater flow is generally to the south-southwest and may be influenced by operation of the downgradient Bowling Green public water supply wells.

In 1986, extensive groundwater contamination was identified throughout the NCIA. Volatile organic compounds (VOCs) were identified in the Bowling Green public water supply wells located approximately 1,000 feet downgradient of the NCIA. Subsequent investigations identified releases of VOCs such as trichloroethene (TCE), tetrachloroethene (PCE), and 1,1,1-trichloroethane (1,1,1-TCA) from the NCIA. The PRAP characterizes the groundwater contamination in OU1 as three separate plumes (referred to as the eastern, central, and western plumes). In 1990, a treatment system consisting of granular activated carbon (GAC) was installed at the Bowling Green water supply wellheads to remove VOCs from the groundwater. Five years later, the treatment system was supplemented with an air stripper. This system is still in operation today and is effective at removing the VOCs to concentrations below applicable drinking water standards.

In October 2003, the New York State Department of Environmental Conservation (NYSDEC), under its Statute authorities, selected in-well vapor stripping/localized vapor treatment as a remedy to address the contaminants in the upper and deep portion of the aquifer (to 225 feet bgs). *Ex situ* extraction and treatment was retained as a contingency if pilot testing determined in-well stripping to be technically or economically infeasible. In 2009, NYSDEC completed a pre-design investigation that determined the Magothy formation to be anisotropic and, as a result, concluded that in-well vapor stripping may not be an effective technology for this site. A subsequent pre-design investigation for the contingent conventional pump and treat system was completed in 2011. However, while this pre-design investigation was underway, the NYSDEC requested that the Site be added to the National Priorities List (NPL) and the design was never completed or implemented. The Site was added to the NPL in September 2011.

Objection to the Proposed Remedial Action Plan

The EPA's PRAP for OU1, while not the final remedy for the Site, needs further evaluation and reconsideration. The selected alternative in the PRAP, Alternative 5, includes installation of 20 in-well vapor stripping wells, 6 conventional extraction wells, *ex situ* treatment of groundwater and vapor at a centralized treatment building, and the potential for *in situ* chemical oxidation (ISCO) to treat areas with VOCs concentrations in groundwater greater than 10,000 micrograms per liter (µg/l). The conceptual design for the interim remedy includes more than 18,000 linear feet of air transfer piping and 8,000 linear feet of water transfer piping through public rights-of-way in predominantly residential areas. The majority of the wells in the conceptual design are to be located in residential areas.

VGSI's principal objection to the PRAP is that the remedial alternatives evaluated by EPA were developed to mitigate unsubstantiated future risks. The Baseline Human Health Risk Assessment (BHHRA) prepared by HDR in May 2013, evaluates risks to future residents and commercial and industrial workers under a future land use scenario in which they use (untreated) Site groundwater for potable purposes. The BHHRA acknowledges that no private potable wells are currently used in the vicinity of the Site, but hypothetically assumes that future residents and commercial/industrial workers could potentially be exposed to OU1 contamination via drinking water if engineering controls at the Bowling Green public water supply facility were not maintained. This fundamental assumption is without basis. Groundwater in this area of Nassau County has been the subject of countless studies and publications over many years. Regional groundwater contamination has been very well documented and publicized. Wells, even for non-potable purposes, cannot be dug without appropriate permits and approvals. Therefore, it is unreasonable to assume that untested or untreated groundwater would be used for drinking water purposes under any future land use scenario. Because of this unjustified assumption, the development of remedial action alternatives excluded viable and practical technologies such as wellhead treatment. EPA should revisit the feasibility study for OU1 to incorporate wellhead treatment into the remedial alternatives development.

As described above, VGSI objects to the foundational basis for the remedial alternatives developed by EPA. In addition, it is impossible to reconcile EPA's evaluation of the remedial alternatives against the nine evaluation criteria both because the proposed alternatives ignore the ongoing wellhead treatment as a readily available and viable technology and because EPA's evaluation of proposed technologies includes critical errors and oversights. The nine criteria for selecting a remedy that EPA is required to evaluate in accordance with the National Contingency Plan (NCP) are as follows:

Threshold Criteria
- Overall Protection of Human Health and the Environment.
- Compliance with Applicable or Relevant and Appropriate Requirements.

Balancing Criteria
- Long-Term Effectiveness and Permanence
- Reduction in Toxicity, Mobility or Volume through Treatment
- Short Term Effectiveness
- Implementability
- Cost

Modifying Criteria
- State Acceptance
- Community Acceptance

EPA's analysis of the first threshold criteria overlooks the fact that Alternative 5 actually creates new exposure risks to human health and the environment compared to existing conditions. The exclusion of wellhead treatment from the development of remedial alternatives ignores the fact that the technology has a demonstrated record of long-term effectiveness and permanence at other Superfund sites. EPA's evaluation of implementability does not account for the unwarranted complexity of Alternative 5, and EPA's cost evaluation significantly underestimates the operations and maintenance (O&M) costs for in-well stripping wells. Finally, the PRAP references EPA Region 2's "Clean & Green" Policy, the goal of which is to "enhance the environmental benefits of federal cleanup programs by promoting technologies and practices that are sustainable"[2]. Alternative 5 is not the most sustainable alternative available.

Each of these concerns is addressed in more detail below.

[2] www.epa.gov/region02/superfund/green_remediation/policy.html

New Exposure Risks to Human Health and the Environment

As shown by the data collected during the vapor intrusion investigations completed by NYSDEC, there is no risk of exposure to contaminated vapors by the residents in the area at this time. However, installing 20 in-well stripping wells that transfer VOC-laden air through 9,000 feet of linear piping through predominantly residential areas will increase that risk. VOCs will be stripped at the wellheads in below grade vaults in residential areas, and while the system may be designed such that there is a vacuum applied at the wellhead, there will be downtime due to equipment malfunctions or electrical service disruptions, and VOC-laden air could seep out of the vaults or cracks and leaks in piping that are likely to develop over 30 years of operation.

Direct contact exposure to contaminated groundwater is also not an issue at this time as the groundwater table is significantly below the residential areas. However, when the water is brought to the surface and transferred via 8,000 feet of piping to the treatment building, there is the potential for risk of exposure. There is greater potential for utility workers to be exposed to contaminated water through accidents, and the transfer piping itself could fail or develop leaks, resulting in discharges of contaminated groundwater to the ground surface or shallow subsurface. Finally, there is the potential for undetected leakage of the underground transfer piping, thereby impacting uncontaminated shallow groundwater.

None of the potential risks identified above currently exist. Yet, they are all far more likely to occur if Alternative 5 is implemented than the hypothetical future use of contaminated groundwater for potable purposes.

Well Head Treatment has Demonstrated Long Term Effectiveness and Permanence

Wellhead treatment, while not thoroughly evaluated in the PRAP as a remedial alternative, is the most applicable sustainable technology for this Site and has been approved by the EPA for the final or interim remedies at several NPL sites where large-scale public water supply systems have been affected by VOCs. It also has a documented history of long-term effectiveness and permanence.

EPA Region 9 has accepted wellhead treatment as a final remedy at several NPL sites, including the San Gabriel Valley (Area 2) Baldwin Park and the San Fernando Valley Superfund sites in Los Angeles County, California. At the Baldwin Park site, commingled plumes of groundwater containing VOCs encompass an area over one mile wide by eight miles in length. Groundwater from the aquifer serves as the drinking water source to over 90 percent of the local community of over 150,000 residents and businesses. VOCs present in the groundwater are similar to the Site and consist of TCE, PCE, carbon tetrachloride, perchlorate, N-nitrosodimethylamine, 1,4-dioxane, and 1,2,3-trichloropropane. In March 1994, after considerable investigation and public involvement, the EPA selected wellhead treatment, consisting of four separate systems capable of treating over 26,000 gpm of contaminated groundwater, as the final remedy for the site. The wellhead treatment systems began operating between 2000 and 2007, using a variety of technologies such as ion exchange, ultraviolet (UV) light and hydrogen peroxide, air stripping, and/or GAC, to remove the targeted compounds from the groundwater. EPA's Five-Year Reviews of the project in 2007 and 2012 concluded that the remedy continues to meet the goals of limiting the further spread of contaminated groundwater, removing contaminants from the groundwater, and ensuring all drinking water standards are met[3].

At the San Fernando Valley (Area 2) Glendale site, contaminated groundwater containing TCE, PCE, and hexavalent chromium encompasses an area of 6,680 acres in a heavily populated area. Prior to the discovery of the VOCs in the groundwater, the aquifer supplied drinking water to over 800,000 residents. Approximately 3 million people live within 3 miles of the site. Impacted drinking water supply wells were shut off in the 1980s until an interim remedy consisting of wellhead treatment could be implemented in 2000. Contaminated groundwater from eight supply wells is treated at a rate of 5,000 gpm at a centrally-located plant to remove the contaminants while the investigation into the location and extent of chromium contamination and evaluation of applicable treatment technologies continues. The system has been protective of human health and the environment because all exposure pathways are currently being controlled[4].

At the Site, the infrastructure for groundwater treatment is already in place at the Bowling Green wellheads, and has been in place since 1990. The equipment was upgraded in 1995 and continues to operate, removing contaminants from the groundwater prior to distribution. The air-stripping and carbon technology employed at Bowling Green have a long history of effectiveness (i.e., removing contaminants down to levels such that the groundwater meets drinking water criteria), and have further demonstrated the ability to be a permanent remedial alternative both at Bowling Green, and at other Superfund sites. Of course, wellhead treatment systems could also be expanded or modified as necessary in the future to meet the needs of the public water supply system.

Implementability – Unwarranted Complexity and High Capital Costs

Alternative 5 in the PRAP includes separate groundwater extraction and treatment systems for each of the eastern, central, and western plumes. In the eastern plume, groundwater would be extracted from 3 conventional pumping wells to address higher concentrations of VOCs that cannot be effectively removed with in-well stripping, while in the central plume groundwater would be treated in 8 in-well vapor stripping wells. For the western plume, groundwater would be treated with a combination of 3 conventional pumping wells and 12 in-well vapor stripping wells. ISCO will be further evaluated for implementation in areas of high VOC concentrations. The PRAP includes one centralized groundwater treatment plant placed in the vicinity of Nassau County Recharge Basin #51.

On page 20 of the PRAP, it is stated that selection of Alternative 4, which includes installation of 11 groundwater extraction wells, treatment at a centralized location, and re-injection to infiltration wells or discharge to a publicly-owned treatment works (POTW),

> "*increases the volume of extracted groundwater that would require ex-situ treatment and handling, thereby increasing both the capital costs and annual operations and maintenance costs without providing a significant reduction of TMV [Toxicity, Mobility, or Volume] of contaminants relative to Alternative 5.Utilizing both in-well vapor stripping and extraction and treatment would additionally provide cost saving measures by reducing capital costs associated with installing independent remedial systems*".

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[3] EPA. EPA Completes "Five-Year Review of Azusa/Baldwin Park Groundwater Cleanup". Superfund Site Fact Sheet, January 2012.
[4] EPA. First Five-Year Review Report for San Fernando Valley Area 2 Superfund Site, Los Angeles County, California. September 2008.

However, this statement is directly contradicted by the estimated capital costs shown on page 18 of the PRAP. The estimated capital cost for Alternative 4 ($8,862,000) is the lowest of all of the active remedial alternatives proposed, compared to $11,728,000 and $10,044,000 for remedial Alternatives 3 and 5, respectively.

The PRAP also states "Access to install the in-well vapor stripping wells and the extraction wells under the preferred remedy, Alternative 5, though still complicated, is more manageable". While it is true that there would only be 20 in-well vapor stripping wells for Alternative 5 compared to 72 under Alternative 3, the amount of trenching needed to implement Alternative 5 for piping installation (approximately 13,000 linear feet), and therefore disruption to traffic flow, is actually more than Alternative 4 (estimated 11,000 linear feet). In addition, having three types of piping to maintain (air sparging, stripped vapors, and extracted groundwater) is more complicated than if one technology were selected. While there are less in-well stripping wells included under Alternative 5 than 3, there will still be significant disruption to residential areas for more than 25 percent of the year when equipment is brought in for routine cleaning of the in-well stripping wells (see Underestimated O&M Costs section below).

Finally, as pointed out in the PRAP, there may also be practical limitations on delivering compressed air to the in-well vapor strippers. While air compressors could be located in the residential neighborhoods near the wellheads, this would require additional electrical systems to install and maintain and may present a noise nuisance to nearby residents. Placing compressors at the central treatment location that could consistently deliver enough pressure to overcome the requisite hydraulic head across 5,000 feet of linear piping to the furthest well may not be technically practical.

Underestimated O&M Costs

VGSI has first-hand knowledge and experience with the type of groundwater circulation treatment system proposed for OU1, having installed, operated, and maintained a similar system associated with the former General Instrument Corporation (GIC) site located at 600 West John Street in Hicksville, New York, from 2003 to 2009.

In 2003, available data indicated that a plume of VOCs potentially attributable to the former GIC site had migrated offsite. Based on an engineering evaluation of available groundwater remediation technologies, groundwater circulation well technology was proposed for an offsite interim remedial measure (IRM)[5]. The purpose of the system was to control the rate of VOC migration further downgradient and reduce the VOC mass at the leading edge of the plume as identified at the time.

A successful pilot test of circulation well technology utilizing Unterdruck-Verdampfer-Brunnen (UVB) style wells was implemented in 2003 with the installation of well UVB-1. Well UVB-1 was installed to 380 feet bgs and consisted of three 30 to 40-foot screens separated by inflatable packers. Water was extracted from the middle screen at a design rate of 60 gallons per minute (gpm), treated in a below-grade air stripper to remove VOCs, and then discharged to both the upper and lower screens of the well. Vapors from the stripper were passed through GAC to remove the VOCs, and the GAC was sent offsite for disposal. The results of the pilot test indicated that the technology was effective at removing the

[5] ESC Engineering of New York, P.C. Letter to Mr. Kevin Carpenter of the NYSDEC from Mr. John P. Black, P.E., regarding Engineering Evaluation and Rationale for Selection of Interim Remedial Measures, Former General Instrument Corporation Site, Hicksville, New York. October 11, 2002.

VOC mass from the groundwater, and a full-scale system including two additional UVB wells with dual air-stripping trays was installed in 2004.

During the pilot test and post-pilot operating period before the full-scale system was installed, well UVB-1 functioned with minimal operational downtime. After approximately 10 months of operation, the first sign of biological fouling of the wells screens in UVB-1 was observed. In late 2004, well UVB-1 was mechanically cleaned with acid to remove iron scale and sediment, a time-consuming process due to removal, cleaning, and replacement of all of the downwell piping and equipment. The overall IRM system operational efficiency for the first calendar year of operation was 54 percent, at a cost of approximately $60,000 per well.

Fouling of the well screens in UVB-1 began again in late January 2005, just months after acid cleaning the well. At around the same time, performance data also indicated fouling of the UVB-2 well screens. Because the acid cleaning of UVB-1 demonstrated limited success, the Aqua Freed® process[6] was implemented in May 2005, after less than one year of full-scale system operation, for rehabilitating all three wells. To reduce long-term O&M costs related to cleaning the wells, Aqua Gard® equipment was installed in each of the wells in August 2005 to enable periodic cleaning without removing the downwell equipment, and a suction flow control device was also installed in well UVB-3 in an attempt to control the flow of very fine sand that was being pulled into this well. The planned schedule for Aqua Gard® cleaning events was initially every six months. While some sand was still pulled into the middle screened interval of well UVB-3, the suction flow control device was somewhat successful at controlling the rate of sand generation. Due to downtime associated with the installation of the Aqua Gard® equipment and other routine O&M activities, the overall operational efficiency of the IRM system decreased to 37 percent and at a cost of approximately $118,000 per well.

The wells were cleaned as a preventative maintenance measure using the Aqua Gard® system in March 2006, and then again five months later due to fouling of the well screens. During the next four months, wells UVB-1 and UVB-3 became fouled in a shorter period of time than previously encountered. Despite the fouling of the well screens, the overall operational efficiency of the IRM system increased to 72 percent in 2006, primarily due to the more efficient well cleanings after the Aqua Gard® equipment was installed. Notwithstanding the increase in efficiency, the O&M costs were still approximately $60,000 per well.

Upon removal of the downwell equipment in January 2007 (while replacing a pump), significant pitting and corrosion was observed on the Aqua Gard® piping used to deliver carbon dioxide in well UVB-3. Therefore, the recharge piping on all three wells was replaced with stainless steel piping, and the system was restarted in March 2007. Within days of restarting the system, well UVB-1 automatically shut down as a result of a blockage in the recharge line to the lower screened interval caused by fine-grained material entering the middle screened interval of the well during operation. After the material was removed using air-lift techniques, the well operated for only weeks before shutting down again due to fine sand infiltration.

The wells were again cleaned in August 2007; however, it was noted that sand was still being generated in well UVB-1, causing the submersible pump to seize and sand to be pumped into the lower screened

[6] A controlled injection of gaseous and liquefied carbon dioxide to dislodge mineral encrustation (iron, manganese and calcium), physical plugging (silts, clays and fine sands), and biological fouling (iron bacteria, sulfate reducing bacteria and slime forming bacteria).

interval of the well. A suction flow control device was installed in well UVB-1 as an attempt to prevent the flow of sand into the well under normal operating conditions. Upon restarting the system, and despite restarting well UVB-1 at a lower extraction rate as a precautionary measure, fine sand was still being pulled into well UVB-1, and the well only operated for a short period of time before the well required cleaning again in the spring of 2008. The operational efficiency of the IRM system was reduced to 28 percent in 2007 after only 3 years of operation, and annual costs increased once again to approximately $114,000 per well.

The final well cleaning event was completed in March 2008. Despite the cleaning, well UVB-1 continued to experience frequent shut downs, and when in operation, extracted water could only be recharged to the upper screened interval due to blockage by sand in the lower screened interval. This well was rendered completely inoperable due to very fine sand infiltration in June 2008, after less than five years of operation. Wells UVB-2 and UVB-3 continued to operate during the rest of 2008 with an overall operational efficiency of 52 percent and at a cost of approximately $75,000 per well.

Wells UVB-2 and UVB-3 continued to operate in 2009 until the blower for well UVB-3 failed and the well was turned off. Based on the increasing O&M costs and the results of additional remedial investigations, well UVB-2 was also manually turned off in May 2009.

The PRAP includes O&M for in-well stripping wells over 30 years. While the conceptual in-well vapor stripping system is a slightly different design than the UVB wells installed at the former GIC site, it is our experience that the continued cycling of oxygenated water below grade causes considerable routine maintenance problems. Similar maintenance problems, such as biofouling in the wells, corrosion of downwell piping, and siltation within the wells, have also been encountered in groundwater circulation well systems at Brookhaven National Labs site in Upton, New York. During operation of the IRM for the GIC site, WSP staff conferred with staff at the Brookhaven National Labs site responsible for system O&M. While the Supplemental Feasibility Study Technical Memorandum for OU1[7] addresses the risk of chemical iron fouling (concluding that the risk is low due to iron concentrations in area groundwater generally less than 1 milligram per liter), the memorandum does not address the risk of iron-related biofouling, which was the cause of the fouling realized at the recirculation well system for the former GIC site.

The PRAP significantly underestimates the costs associated with ongoing maintenance of these types of systems (approximately $26,000 per well annually)[8], as well as the logistics of maintaining numerous wells within residential areas. Mechanically cleaning a well will take several days due to removal and replacement of the downwell equipment, and there is significant heavy equipment such as pump rigs, frac tanks, and support vehicles involved. Even conservatively assuming each well would only be cleaned semi-annually and that it takes two days to clean each well, this equipment would be present in residential neighborhoods for more than 25 percent of the year.

At the beginning of operation of the full-scale IRM system for the former GIC site, annual O&M costs were approximately $60,000, however, that rapidly increased to an average O&M cost of $288,000, or approximately $96,000 per well, which is significantly greater than the $26,000 per well included in the

[7] Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site Nassau County, New York, HDR/O'Brien & Gere Joint Venture, July 2013.
[8] $680,000 annual O&M cost divided by 26 total wells (20 in-well stripping wells and 6 conventional extraction wells).

PRAP. Based on our experience, this estimated O&M cost per well is significantly less than what is likely to be incurred and should be further evaluated.

Alternative 5 is Not the Most Sustainable Alternative Available

At the Site, the infrastructure for groundwater treatment is already in place at the wellheads, requiring significantly less impact on the environment compared to Alternative 5. No additional energy is required to transfer the contaminated water from the ground surface to the point of treatment because the water is already being extracted for drinking water use. Wellhead treatment systems could be expanded or modified as necessary in the future to meet the needs of the public water supply system.

Conclusion

For the reasons presented in this letter, the EPA's selection and evaluation of remedial alternatives for OU1 includes significant flaws that warrant additional consideration and reevaluation. All of the remedial alternatives considered by EPA were developed to mitigate future risks that are unsubstantiated, and as a result, other viable and practical technologies were excluded from consideration. EPA's preferred Alternative 5 actually creates new exposure risks to human health and the environment compared to existing conditions. Alternative 5 is also unnecessarily complex and costly to install, and local experience indicates that Alternative 5 will be considerably more expensive to operate and maintain than assumed. Finally, a more sustainable remedial alternative with a documented record of long-term effectiveness and permanence is available that has not been included in EPA's evaluation, namely wellhead treatment at existing and future public supply wells. As such, the feasibility study for OU1 should be revisited to consider wellhead treatment as an alternative and the evaluation of alternatives should be revised to account for the flaws highlighted herein.

Sincerely yours,

James A. Sobieraj, P.E.
Senior Project Director

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cc: Vishay GSI, Inc.
Todd M. Hooker, Esq., Laddey, Clark & Ryan LLP